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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,864	03/09/2004	Cheng-Chung Liang	2003P03674US01	2679

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Siemens Corporation.
Intellectual Property Department
170 Wood Avenue South
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EXAMINER
RADKIEWICZ, JARED

ART UNIT	PAPER NUMBER
2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/796,864	LIANG, CHENG-CHUNG
	Examiner	Art Unit	
	Jared W. Radkiewicz	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-39</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-39</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>20 September 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9/20/2004</u>.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____ .

DETAILED ACTION

Claim Rejections - 35 USC § 101

1.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of
> matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the
> conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent
Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV,
reads as follows:

> Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional
> descriptive material." In this context, "functional descriptive material" consists of data structures and
> computer programs which impart functionality when employed as a computer component. (The
> definition of "data structure" is "a physical or logical relationship among data elements, designed to
> support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and
> Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited
> to music, literary works and a compilation or mere arrangement of data.

> When functional descriptive material is recorded on some computer-readable medium it becomes
> structurally and functionally interrelated to the medium and will be statutory in most cases since use of
> technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32
> F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a
> computer readable medium that increases computer efficiency held statutory) and Warmerdam, 33
> F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in
> memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at
> 1760 (claim to a data structure per se held nonstatutory).

> In contrast, a claimed computer-readable medium encoded with a computer program is a computer
> element which defines structural and functional interrelationships between the computer program and
> the rest of the computer which permit the computer program's functionality to be realized, and is thus
> statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claims 27-39 are rejected under 35 U.S.C. 101 because the claimed invention is

directed to non-statutory subject matter as follows. Claim 27 defines a program storage

device embodying functional descriptive material. However, the claim does not define a

computer-readable medium or computer-readable memory and is thus non-statutory for

that reason (i.e., "When functional descriptive material is recorded on some computer-

readable medium it becomes structurally and functionally interrelated to the medium

and will be statutory in most cases since use of technology permits the function of the

descriptive material to be realized" – Guidelines Annex IV). The scope of the presently

claimed invention encompasses products that are not necessarily computer readable,

and thus NOT able to impart any functionality of the recited program. The examiner

suggests amending the claim(s) to embody the program on "computer-readable

medium" or equivalent; assuming the specification does NOT define the computer

readable medium as a "signal", "carrier wave", or "transmission medium" which are

deemed non-statutory (refer to "note" below). Any amendment to the claim should be

commensurate with its corresponding disclosure.

Claim Rejections - 35 USC § 102

2.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be titled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3.   **Claims 1, 4, 5, 7, 8, 9, 11, 12, 14, 17, 18, 20, 21, 22, 24, 25, 27, 30, 31, 33, 34,**

35, 37 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Jakab et al.

(Jakab et al. as cited in the IDS and linked to in the attached archived page as captured

from www.archive.org on 9/9/2001).

Regarding **claim 1**, Jakab teaches a method for image segmentation in a three-dimensional environment ("the 3D Slicer", Jakab Title), the method comprising:

receiving scan data ("Your first job will be to "Add Volume". This will allow you to load the original data set", Jakab section titled "Initial Screen");

selecting a viewing vector relative to the scan data;

rendering the scan data as a 3D image about the viewing vector;

displaying the rendered 3D image (the illustration in Jakab section ""Creating a Label Map" shows a rendered view of 3D data being displayed relative to a viewing vector);

selecting a range of 2D image slices within the 3D image (Jakab's 3D Slicer operates on user inputted, user selected slices, "your original grayscale images", Jakab section titled "Segmenting Your Data");

performing 2D segmentation on the selected slices relative to the viewing vector to obtain a segmented 3D object ("You must now click through all 60 of your original grayscale images and segment them", Jakab section titled "Segmenting Your Data"); and

displaying the segmented 3D object ("The model should now be created and will be displayed on the 3D image", Jakab section titled "Making Your 3D Model").

Regarding **claim 14**, Jakab teaches the method outlined in claim 1 operating on a computer apparatus ("Slicer operates on a SUN Microsystems UNIX based network", Jakab Introduction).

Regarding **claim 27**, Jakab teaches the method outlined in claim 1 operating on a computer apparatus wherein computer program inherently reside on some form of computer readable medium ("Slicer operates on a SUN Microsystems UNIX based network", Jakab Introduction).

Regarding **claims 4, 17, and 30**, Jakab teaches the method as defined in claims 1, 14, and 27 wherein the step of selecting a range of slices within the 3D image comprises selecting 2D image planes along different axis to be displayed within the rendered 3D scene (The figure "Label Map" shows three 2D slices selected along different axis within the 3D scene, Jakab section titled "Creating a Label Map").

Regarding **claims 5, 18, and 31**, Jakab teaches the method as defined in claims 4, 17, and 30 wherein the step of performing 2D segmentation comprises determining the correspondence between a mouse point and the data within a 2D image in the 3D rendered image ("Now take your mouse and encircle the section of the image that you wish to segment", wherein the image being operated on is a 2D image and is also a part of the 3D image; Jakab section titled "Segmenting Your Data").

Regarding **claims 7, 20, and 33**, Jakab teaches the method as defined in claims 1, 14, and 27 wherein the step of performing 2D segmentation comprises drawing the segmentation contours in a plurality of different planes in the rendered 3D image within

a single drawing session ("You must now click through all 60 of your original grayscale images and segment them", Jakab section titled "Segmenting Your Data").

Regarding **claims 8, 21, and 34**, Jakab teaches the method as defined in claim 7, 20, and 33 further comprising back-projecting the point coordinates of the segmentation contours within each 2D image plane to the 3D coordinate space ("select the volume to be used to create your 3D model. This is the segmented label map that you saved in step 5", Jakab section titled "Making Your 3D Model").

Regarding **claims 9, 22, and 35**, Jakab teaches the method as defined in claims 1, 14, and 27 further comprising:

selecting a second viewing vector relative to the rendered 3D image; and re-rendering the scan data as a 3D image about the second viewing vector (""Or" stands for image orientation - change by clicking on it and selecting", Jakab section titled "Creating a Label Map").

Regarding **claims 10, 23, and 36**, Jakab teaches the method as defined in claims 1, 14, and 27 with the step of performing 2D segmentation comprising:

selecting an anchor point; transforming the anchor point from object coordinates into window coordinates; and determining an intersection of the anchor point with an image plane ("Now take your mouse and encircle the section of the image that you wish to segment ... The polygon you created should connect itself and theoretically overlay,

for example, the tumor in the segmented slice", Jakab section titled "Segmenting Your

Data").

Regarding **claims 11, 24, and 37**, Jakab teaches the method as defined in

claims 1, 14, and 27 wherein the scan data is produced by a medical imaging device

(Jakab's software operates on "MRI images of the brain", Jakab section titled "Starting

the Slicer").

Regarding **claims 12, 25, and 38**, Jakab teaches the method as defined in

claims 11, 24, and 37 wherein the segmented 3D object is indicative of an organ (Jakab

uses the examples of "ventricles for your ventricles label map or tumor for your tumor

label map", Jakab section titled "Making Your 3D Model").

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5.   Claims **2, 3, 15, 16, 28, and 29** are rejected under 35 U.S.C. 103(a) as being

unpatentable over Jakab et al. in combination with Gering (David T. Gering: "A System

for Surgical Planning and Guidance using Image Fusion and Interventional MR" Thesis:

Massachusetts Institute of Technology 1999).

Regarding claims **2, 15, and 28**, Jakab teaches claims 1, 14, and 27.

Jakab does not teach claims 1, 14, or 27 further comprising performing in-scene

control of slices within the 3D image by grabbing tabs on the 2D slice images within a

rendered 3D image.

Gering teaches controlling slice selection within a 3D view ("users to allow the

slice-by-slice editing to be administered on either axial, coronal, or sagittal slices merely

by clicking on the appropriate slice", Gering Section 2.4.1 Page 39)

It would have been obvious at the time of invention to one of ordinary skill in the

art to use the direct slice selection of Gering in the 3D segmentation method of Jakab to

"prevent[s] the screen from becoming cluttered with confusing, overlapping, pop-ups"

(Gering Section 2.9.1 Page 56).

Regarding claims **3, 16, and 29**, Jakab and Gering teach claims 1, 14, and 27

further comprising providing sliding bars movable along restricted directions to guide the

selection of slice ranges ("By placing your mouse over this box, you will see a sliding

scale which allows you to move through the original data images", Jakab section titled

"Creating a Label Map").

Claims 6, 19, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jakab et al. in combination with Rubin (US 5,264,836).

Regarding **Claims 6, 19, and 32**, Jakab teaches claims 5, 18, and 31, respectively.

Jakab does not teach the method as defined in claims 5, 18, or 31, the step of determining the correspondence comprising determining the intersection of the mouse point and the 2D slice image within the 3D scene by:

receiving a mouse point in window coordinates;

inverse transforming the mouse point to get its corresponding first point in object coordinates of the scan data;

computing a second point along a straight vector from the first mouse point; and determining the intersection point as a function of the first point, a distance from the first point to the intersection point, and a vector obtained by subtracting the first point from the second point.

Rubin teaches a method wherein the step of determining the correspondence comprising determining the intersection of the mouse point and the 2D slice image within the 3D scene by:

receiving a mouse point in window coordinates; inverse transforming the mouse point to get its corresponding first point in object coordinates of the scan data ("converting two dimensional mouse points into three dimensional coordinates", Rubin);

computing a second point along a straight vector from the first mouse point; and determining the intersection point as a function of the first point, a distance from the first

point to the intersection point, and a vector obtained by subtracting the first point from

the second point (Rubin Figures 2-7 depict the process of calculating a 'shadow line' in

a 3D scene with reference to a 2D 'Translation Plane').

It would have been obvious at the time of invention to one of ordinary skill in the

art to use the 2D cursor control in a 3D environment of Rubin in the segmentation

device of Jakab because Rubin's method can "be readily implemented within a software

program (such as a Computer Aided Design (CAD) program) running on any of a

number of commercially available computer systems (i.e., a Macintosh computer

manufactured by Apple Computer, Inc., of Cupertino, Calif.) which are operative to work

with a two axes control device (such as a mouse" (Rubin Column 2 Lines 21-30), and

Jakab's segmentation device is, generally speaking, a 3D CAD program running on a

computer with a two axes control device.

6.   Claims **13, 26, and 38** are rejected under 35 U.S.C. 103(a) as being

unpatentable over Jakab et al. in combination with Blake at al. (US 2003/0103682 A1).

Regarding **claims 13, 26, and 38**, Jakab teaches claims 1, 14, and 27.

Jakab does not teach claims1, 14, or 27 further comprising manually overriding a

section of 2D segmentation disposed contiguously between two sections of automatic

2D segmentation.

Blake teaches manually overriding a section of automatic 2D segmentation ("The

user likelihood .sup.u(q.sub.i) is a vehicle for guidance supplied interactively, by a user,

wishing to bias or override the curve constructed automatically on the basis of

L.sub.i.sup.e and L.sub.i.sup.e alone.", Blake Paragraph 90)

It would have been obvious at the time of invention to one of ordinary skill in the

art to provide the manual override to automatic segmentation of Blake to the invention

of Jakab to provide "a robust mechanism or component that provides boundary

definition of an object in an image for purposes of selecting a region of interest" (Blake

Paragraph 12).

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Jared W. Radkiewicz whose telephone number is (571)

270-1577. The examiner can normally be reached on 8:00 - 5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Brian P. Werner can be reached on (571) 272-7401. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published

applications may be obtained from either Private PAIR or Public PAIR. Status

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800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JWR

/Brian P. Werner/
Supervisory Patent Examiner (SPE), Art Unit 2624